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Taking advantage of noise in quantum reservoir computing

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The biggest challenge that quantum computing and quantum machine learning are currently facing is the presence of noise in quantum devices. As a result, big efforts have been put into correcting or mitigating the induced errors. But, can these two fields benefit from noise? Surprisingly, we demonstrate that under some circumstances, quantum noise can be used to improve the performance of quantum reservoir computing, a prominent and recent quantum machine learning algorithm. Our results show that certain noise types can be beneficial to machine learning, while others should be prioritized for correction.

This critical result sheds new light on the physical mechanisms underlying quantum devices, providing solid practical prescriptions for the successful implementation of quantum information processing in nowadays hardware.

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